Chapter 4.1 GROUND WATER PROTECTION PROGRAMS

Ground water programs in Virginia strive to maintain existing high water quality through adopted statutes, regulations, and policies. Advancing ground water protection efforts is the goal of many state programs in numerous state agencies. In late 1986 an interagency committee was formed to stimulate, strengthen, and coordinate ground water protection activities in Virginia. The Ground Water Protection Steering Committee (GWPSC) continues to meet bi-monthly with representation from the following agencies:

Department of Environmental Quality (DEQ)
Department of Health (VDH)
Chesapeake Bay Local Assistance Department (CBLAD)
Department of Mines, Minerals, and Energy (DMME)
Virginia Polytechnic and State University (VPI&SU)
Department of Housing and Community Development (VDH&CD)
Department of Agriculture and Consumer Services (VDACS)
Department of Conservation and Recreation (DCR)
Department of General Services, Division of Consolidated Laboratories (DCLS)
Department of Business Assistance (DBA)
US Geologic Survey (USGS)

The following paragraphs briefly describe ground water protection activities at member agencies. Information provided in Tables 4.1-1, 4.1-2, 4.1-3 and 4.1-4 is presented for the Commonwealth as a whole. System upgrades at the VDH prevented manipulation of listed parameters and detections/volations for public water supply data. In addition, budgetary constraints within the Commonwealth prevent coordinated data collection activities designed to characterize ambient ground water quality and changes to that quality over time on a statistically valid statewide basis.

Source Water and Wellhead Protection Efforts

VDH established several committees in 1998 to develop Virginia=s Source Water Assessment Program. VDH is working with the USGS and the Virginia Rural Water Association to ensure successful program implementation. VDH through a Drinking Water State Revolving Loan Fund Set-Aside contracted with the Virginia Rural Water Association to contact waterworks to educate them on the importance of source water protection and to assist them in understanding and developing a source water protection plan. Seventy-five waterworks were visited.

Building grassroots support for ground water and wellhead protection continue to be priorities of the GWPSC. Accomplishments during this reporting period include hosting three one-day workshops, the voluntary completion of Biennial Wellhead Protection Reports, assisting Virginia Rural Water Association with outreach and education, and development and distribution of another wellhead protection publication entitled *Implementing Wellhead Protection: Model Components for Local Governments in Virginia*. Future efforts will include cooperating with the Virginia Department of Health on source water protection issues. Funding for GWPSC activities, including wellhead protection, is provided through DEQ's Federal Ground Water Protection Grant.

Table 4.1-1 Public Water Supply Systems and Population Served from Virginia=s 1997 Biennial Wellhead Protection Report

Total Number of Public Water Supply (PWS) systems	3,963
Total Number of GW-Dependent PWS Systems	3,581
Total Number of Community Water Supply Systems	1,358
Total Number of GW-Dependent Community Water Supply Systems	1,020

Total Population Relying on Community Water Supply Systems	6,775,030
Total Population Relying on GW-Dependent Community Water Supply Systems	521,781
Total Number of GW-Dependent Non-Transient Non-Community PWS Systems	638
Total Number of GW-Dependent Transient Non-Community PWS Systems	1,916

Ground Water Management Act of 1992

The 1992 session of the Virginia General Assembly adopted the Act and repealed the Ground Water Act of 1973. The Act establishes criteria for the creation of ground water management areas and requires person who withdraw more than 300,000 gallons of ground water per month to obtain permits. The Act requires that previously exempted agricultural ground water withdrawals obtain ground water withdrawal permits. The DEQ adopted regulations to implement the Act effective January 1, 1999. This regulation includes specific requirements for agricultural ground water withdrawal permits and requires DEQ to perform technical evaluations of proposed withdrawals.

Underground Storage Tank (UST) Program

The DEQ currently maintains records on some 74,000 regulated USTs at 25,000 facilities in Virginia. The UST program maintains a computer database of all UST information and tracks the reporting of installations, upgrades, repairs, and closures. Local building/fire officials assist the program by permitting UST activities statewide. Compliance monitoring is performed on a periodic basis and includes computer searches, outreach through presentations and informational mailings, compliance mailings, and random site inspections. By December 22, 1998 all existing (pre-1988) USTs were required to be upgraded to new tank standards, replaced, or closed. The DEQ conducted 2,900 UST inspections during FY 1999. Federal grant funds and matching State funds support this program.

Leaking Underground Storage Tank (LUST) Program

The LUST side of the UST program is involved in overseeing leaks from underground storage tanks. Regional Office Ground Water staff perform initial investigations and direct owners/operators to take appropriate remediation activities. Regional Office staff review all required reports and issue corrective action plan (CAP) permits as needed. Central office staff provide audit/review of regional office approved site characterization (SCR) reports and CAPs and assist the regional staff as necessary. To assist owners and operators with UST releases, the tank program processes claims from UST owners/operators for reimbursement of certain corrective action costs and third party claims through the Virginia Petroleum Storage Tank Fund (VPSTF). A combination of Federal LUST Trust Funds and VPSTF monies are used to implement this effort.

In cases where owners/operators cannot be identified or are unable to act effectively the DEQ LUST staff utilize a private contractor to investigate and cleanup. The LUST staff also manages the alternate water supply (AWS) effort to provide clean drinking water to individuals with petroleum contaminated water supplies.

Aboveground Storage Tank (AST) Program

The State Water Control Board adopted a new regulation, 9 VAC 25-91-10 et seq. which consolidated the three repealed regulations, e.g., (i) Oil Discharge Contingency Plans and Administrative Fees for Approval, 9 VAC 25-90-10 et seq. (VR 680-14-07), (ii) Facility and Aboveground Storage Tank Registration Requirements, 9 VAC 25-130-10 et seq. (VR 680-14-12), and (iii) Aboveground Storage Tanks Pollution Prevention Requirements, 9 VAC 25-140-10 et seq. (VR 680-14-13), relating to facilities and ASTs located in the Commonwealth that have an aboveground storage capacity of 25,000 gallons or more of oil into a single

regulation. Concurrently the board repealed the three previously existing regulations. Section 62.1-44.34:15.1.5 was added which required the Board to establish criteria for granting variances from the AST Pollution Prevention Requirements (9 VAC 25-140-10 et. seq.). This new regulation incorporates statutory amendments and aids DEQ's efforts to eliminate duplication, provide uniformity in regulation, streamline government services, and increase performance and efficiency.

The DEQ has reviewed final facility response plan regulations implementing the provisions of the federal Oil Pollution Act of 1990 and found them to be congruous, in most cases, with the ODCP requirements of 9 VAC 25-90-10 et seq. To better facilitate a one plan concept, DEQ will evaluate and take the necessary steps to accept USCG and EPA approved response plans either wholly or with state-specific information added.

All actions are expected to be beneficial to the regulated community as well as the DEQ. The primary advantages of this regulation for the public, the DEQ and the Commonwealth of Virginia are :

(1) to provide the regulated community with a coordinated federal/state approach by DEQ=s acceptance, in most cases, of federally approved response plans;

(2) to provide regulatory relief and variance options to those facilities and oil products addressed in the 1994 amendments to state law;

(3) to consolidated the exclusions of the three previously existing regulations and add exemptions required by statutory amendments for uniformity and lessen the burden of duplicated regulation on the regulated community;

(4) to consolidated the definitions of the three previously existing regulations and incorporate additional definitions in order to provide uniformity, clarity and lessen the burden of duplicated regulation on the regulated community;

(5) to provide criteria for granting variances for the pollution prevention requirements; and

(6) to provide pollution prevention requirements for facilities not engaged in the resale of oil.

Waste Permitting Activities

The Resource Conservation and Recovery Act (RCRA) Base Program addresses ground water quality issues at both permitted and unpermitted land-based units. Information provided in Table 4.1-3 RCRA Corrective Action category is for non Hazardous and Solid Waste Amendment (HWSA) sites and is divided into two sectors. The term "sites" refers to facilities; most facilities have more than one regulated unit. There are a total of 47 units among the 29 facilities. The "Base Program Correction Action" sites or "Little C" sites are permitted units required to perform corrective action if the ground water concentrations exceed established Ground Water Protection Standards. The second sector is "Unpermitted Land Disposal Facilities (LDF)" where continued operation of the facility is contingent upon removal or decontamination of contaminated media. In instances where the LDF is closed, ground water monitoring is required to demonstrate that closure performance standards are met. When standards are not met, the site is issued a Post Closure Permit and corrective action is undertaken.

Federal Facilities and Superfund Program

Included in Table 4.1-3 are ground water contamination statistics from the DEQ's Federal Facilities Restoration and Superfund Office. The Federal Facilities Restoration activities include Department of Defense

(DOD)installations (Army, Navy, Air Force, Defense Logistics Agency, and Formerly Used Defense Sites) and a NASA installation for a total of 33 installations. Currently eight Federal Facilities are listed on the National Priority List (NPL) and 25 non-NPL sites. Base Realignment and Closure is occurring at seven facilities. Federal funding from the Department of Defense supports the Federal Facilities Restoration program. The Superfund Program, funded with both Federal and State dollars, carries out activities required by law or legal agreements at 20 NPL sites. Two of these sites have now been cleaned up and delisted. Additional activities within this Office include DEQ's Voluntary Remediation Program and the Brownfields Program. The Voluntary Remediation Program provides a mechanism for eligible participants to voluntarily clean up properties not mandated for remediation under existing environmental laws. This program serves as a mechanism for cleanup of Brownfield sites. There are currently 75 Brownfield sites that are either potential candidates for clean up, formally in the program or have been cleaned up under the program. A combination of registration fee and EPA funding supports the Voluntary Remediation Program The DEQ's Brownfields Program, funded through EPA, is currently under development. None of these four programs currently collect ground water quality data; they do receive and review data collected by outside sources.

Pesticide Disposal Program

The VDACS, in cooperation with the Virginia Pesticide Control Board, has conducted a highly popular Pesticide Disposal Program since 1990. As of October, 1999 more than 368.7 tons of unwanted pesticides have been collected from 148 agricultural producers, pesticide dealers and commercial pest control firms. All of Virginia's counties and independent cities were served by this program by the end of 1998. A new maintenance phase, in which the State was subdivided into four regions, was initiated in 1999. The pesticide disposal program has benefitted from a high level of interagency cooperation among the VDACS, DEQ, DCR, DCLS, and Virginia Cooperative Extension. Funding to support this program has been pooled from Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) and Clean Water Act (Sections 319 Non Point Source and 106 Ground Water Protection) grants and the Office of Pesticide Services program fees.

Pesticide and Ground Water Management Plan

In response to the EPA Pesticides and Ground Water Strategy, the VDACS formed a task force in 1992. This committee comprised of representatives from the water user community, four representatives from the GWPSC, four representatives from the agricultural community, a member from the Board of Agriculture and one from the Virginia Pesticide Control Board. The objective of the task force was to draft a Generic State Management Plan (GSMP) for pesticides and ground water. GSMP development was cooperatively funded by the VDACS, DCR, and DEQ through EPA FIFRA, Clean Water Act (Sections 319 Non Point Source and 106 Ground Water Protection) grants. The completed GSMP was submitted to EPA Region III in 1993 and received EPA concurrence in 1995. The GSMP established a graduated response plan for pesticides detected in ground water, a process for developing pesticide specific management plans (PSMP) should such be required by anticipated federal rule making and a graduated response approach for managing pesticides identified as potential threats to ground water. In 1999, VDACS provided revised cost estimates for implementing specific pesticides in ground water management plans in the Commonwealth to the US EPA.

Pesticides in Ground Water Monitoring Project

In preparation for implementation of PSMPs, the VDACS initiated a pilot monitoring project in September, 1994 and completed in March, 1996. A total of 49 shallow bored wells were sampled in eight localities. Samples were analyzed for alachlor, atrazine, cyanazine, metolachlor, simazine and nitrates. At least one pesticide was detected in nine of the wells. One well exceeded the Maximum Contaminant Level (MCL) established under the Safe Drinking Water Act for alachlor (2 ppb) with a detection of 9 ppb. Thirty four wells had detectable levels of nitrate. Seven wells exceeded the MCL established under the Safe Drinking Water Act of 10 ppm. The highest level of nitrate was 17.2 ppm.

CIBA Atrazine Monitoring Study

The VDACS cooperated in a Atrazine Monitoring Study with CIBA Ag Chemicals in 1994. Under this study,

64 drinking water wells were sampled and analyzed for atrazine, simazine, prometon, propazine, ametryn, prometryn, metalaxyl, metolachlor, cyanazine, three metabolites of atrazine, and nitrates. At least one pesticide was found in 19 wells. However, concentrations were generally very low. No wells had pesticide residues at or above the MCL. Fifty-three wells had detectable levels of nitrate and sixteen of these wells had levels of nitrates at or above the MCL of 10 ppm.

Cat Point Creek Watershed-Shallow Ground Water Monitoring

The DCR, in cooperation with the Tidewater Resource Conservation and Development Council, initiated a ground water monitoring study in the Cat Point Creek watershed in December, 1995. Land use in the watershed is dominated by rowcrop agriculture, grasslands, and forestry. The purpose of this ground water study was to begin a multiple-year process to evaluate the effectiveness of integrated crop management (ICM) in reducing the loading of nitrate and pesticides to the shallow water-table aquifer. ICM incorporates nutrient management and pest management into one plan to be followed by producers. In this study, two producers implemented ICM at three different study sites (sites 1-3) beginning in the spring of 1996. A well cluster, consisting of three wells per cluster, was established in each of the ICM fields and in the control fields. Ground water samples for nutrients were collected twice a month between February and July and on a monthly basis for all other months. Pesticide samples were collected in May and November of 1996. Atrazine was the only pesticide detected in ground water and it was only found in samples collected at the ICM and control fields at site 1 in May,1996. Pesticides were not detected in any of the November, 1996 samples. Ground water monitoring activities were funded through the DEQ's Federal 106 Ground Water Protection Grant.

Polecat Creek Watershed-Shallow Ground Water Monitoring

The CBLAD initiated ground water monitoring for nitrates as part of the Polecat Creek Watershed project in June 1997. Activities are partially funded by the Clean Water Act, Section 117 Chesapeake Bay program grant funds and partially by the USGS. The USGS is conducting the ground water monitoring in Caroline County under a cooperative agreement with CBLAD. There are two well transects installed adjacent to agricultural land uses and one transect installed at a residential subdivision that uses septic systems for waste treatment. CBLAD hopes to add well transects at commercial and forested sites as well. The USGS is determining flow periods, water history, and water chemistry for ground water in this watershed and, ultimately, attempting to learn if pollution is flowing from various types of land uses to surface waters through the ground water.

Karst Ground Water Protection Program

The project is implemented by the Natural Areas Management Program in order to document, preserve, and restore the ground water habitats of sensitive species. Project implementation is shared with the Nonpoint Source Management program; an arrangement that highlights the integral connection between the preservation of natural heritage resources and the quality of the State=s waters and drinking water supplies. Staff focus on threats to water quality in a 33-county region underlain by cavernous and/or mined-out bedrock in western Virginia, and work in close cooperation with Soil and Water Conservation Districts, US Geological Survey, and the State=s Natural Area Preserves Systems. Karst ground water protection is promoted through a combination of technical assistance, data collection (monitoring, mapping, and tracer testing), and public outreach, which includes brochures, materials, and educational efforts coordinated through Project Underground and Project WET. With regard to ground water issues, the program facilitates coordination between the diverse group of agencies and institutions affecting nonpoint source management in each basin.

As demand and reliance on ground water resources increase in agricultural areas undergoing unprecedented residential growth, state agencies are working to establish a karst ground water monitoring network in the vicinity of unstudied nonpoint sources, such as land application sites and rural subdivisions. In addition, the Karst Ground Water Protection Program is cooperating with the US Forestry Service on a karst resource inventory on USFS owned lands.

Virginia Nonpoint Source Pollution Management Program

Virginia has recently developed an update document for the Nonpoint Source Pollution Management Program. This recently completed plan outlines current NPS ground water protection activities and establishes ground water protection goals for the future.

Ground Water Protection Program Conclusion

Ground water programs in Virginia strive to maintain the existing high water quality. The Virginia Ground Water Protection Steering Committee (GWPSC), established in 1986, continues to meet bi-monthly as a vehicle for sharing information, for directing attention to important ground water issues, and for taking the lead on ground water protection initiatives requiring an inter-agency approach. This inter-agency advisory committee is designed to stimulate, strengthen, and coordinate ground water protection activities in the Commonwealth. Ground water protection activities in the Commonwealth are as varied as the funding sources that support them.

Table 4.1- 2 Major Sources of Ground Water Contamination

Contaminant Source	Ten Highest-Priority Sources(/)	Factors Considered in Selecting a Contaminant Source	Contaminants
Agricultural Activities			
Agricultural chemical facilities			
Animal feedlots			
Drainage wells			
Fertilizer applications	/	(F) State GW Protection Strategy	(E)
Irrigation practices			
Pesticide applications	/	(F) State GW Protection Strategy	(A,B)
Storage and Treatment Activities			
Land application	/	(F) State GW Protection Strategy	(E)
Material stockpiles			
Storage tank (above ground)			
Storage tank (underground)	/	(F) State GW Protection Strategy	(D)
Surface impoundments	/	(F) State GW Protection Strategy	(E)
Waste piles			
Disposal Activities			
Landfills	/	(F) State GW Protection Strategy	(M) 40 CFR-App IX
Septic systems	/	(F) State GW Protection Strategy	(J)
Hazardous waste generators			
Hazardous waste sites			
Industrial facilities			
Material transfer operations			
Mining and mine drainage	/	(F) State GW Protection Strategy	(M) Acid Leachate
Pipeline and sewer lines			
Salt water intrusion	/	(F) State GW Protection Strategy	(G)
Urban runoff	/	(F) State GW Protection Strategy	(M) NPS pollutants such as fertilizers & heavy metals
Other sources (please specify)			

A-Inorganic Pesticides
B-Organic Pesticides
C-Halogenated Solvents
D-Petroleum Compounds
E-Nitrite
F-Flouride
G-Salinity/Brine
H-Metals
I-Radionuclides
J-Bacteria
K-Protozoa
L-Viruses
M-Other

Table 4.1-3 Summary of State Ground Water Protection Programs

Programs or Activities	Check* (/)	Implementation Status	Responsible State Agency
Active SARA Title III Program	/	fully-estab.	DEQ
Ambient ground water monitoring system			
Aquifer vulnerability assessment	/	under devel.	VDCR
Aquifer mapping			
Aquifer characterization			
Comprehensive data management system			
EPA-endorsed Core Comprehensive State Ground Water Protection Program (CSGWPP)			
Ground water discharge permits (VPA)	/	fully-estab.	DEQ
Ground water Best Management Practices			
Ground water legislation (Quantity)	/	fully-estab.	DEQ
Ground water classification			
Ground water quality standards	/	fully-estab.	DEQ
Interagency coordination for ground water protection initiatives	/	fully-estab.	DEQ
Nonpoint source controls	/	cont. efforts	VDCR
Pesticide State Management Plan (Generic)	/	fully estab.	VDACS
Pollution Prevention Program			
Resource Conservation and Recovery Act (RCRA) Primacy	/	fully-estab.	DEQ
Source Water Assessment Program		under development	VDH
State Superfund	/	under revision	DEQ
State RCRA Program incorporating more stringent requirements than RCRA Primacy			
State septic system regulations	/	fully-estab.	VDH
Underground storage tank installation requirements	/	fully-estab.	DEQ
Underground Storage Tank Remediation Fund	/	fully-estab.	DEQ
Underground Storage Tank Permit Program	/	fully-estab.	DEQ
Underground injection Control Program			
Well abandonment regulations	/	fully-estab.	VDH
Well Installation regulations		fully estab.	VDH

Table 4.1-4 Ground Water Contamination Summary

Aquifer Description Commonwealth of Virginia
Data Reporting Period 1/94 - 12/98

Source Type	Present in reporting area	Number of sites in area	Number of sites that are listed and/or have confirmed releases	Number with confirmed groundwater contamination	Contaminants	Number of site investigations (optional)	Number of sites that have been stabilized or have had the source removed (optional)	Number of sites with corrective action plans (optional)	Number of Sites with active remediation (optional)	Number of sites with cleanup completed (optional)
NPL		20	20	14	(A) append 9					
CERCLIS (non-NPL)		200+								
DOD/DOE (NPL) _ (NPL)		8	8	8	(B)					
DOD/DOE(nonNPL)		25	25	15						
LUST as of 9/99		14,778	14,778		petroleum hydrocarbons				2,889	11,889
RCRA Corrective Action	PERMITTED	12 facilities	11	11	40CFR APP IX	12	1	5	2	
	UNPERMITTED Unpermitted_ land_ based on HSWA Corrective Action	17 facilities	12	17	40CFR APP IX	0	0	0	11	
Underground Injection										
State Sites										
Nonpoint Sources										
Other (specify)										

Source Type Abbreviations

NPL - National Priority List
CERCLIS (non-NPL) - Comprehensive Environmental Response, Compensation, and Liability Information System
DOE - Department of Energy
DOD - Department of Defense
LUST - Leaking Underground Storage Tanks
RCRA - Resource Conservation and Recovery Act

Contaminant Type

(A) listed and characteristic hazardous waste

(B) metals, halogenated organics, POL,PCB, Pesticides